Bechtel National, Inc.

Job No. 24590

SUPPLIER DOCUMENT STATUS

1. Work may proceed.
2. Revise and resubmit. Work may proceed subject to resolution of indicated comments.
3. Revise and resubmit. Work may not proceed.
4. Review not required. Work may proceed.

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligations.

REVIEWED										

G-321 Document Category N/A
[From Supplement A to G-321 (E) or G-321-V (V), as applicable, or "N/A" if SSRS is used]

Supersedes BNI Document No. N/A Rev. _____
[When applicable]

Accepted by DC Pflueger DC Pflueger 2/6/04
Print Name Signature Date

Released by N/A _____ _____
[When applicable] Print Name Signature Date

416 GP&S 6-03

24590-CM-HC4-HXYG-00138-01-00019
REV. 00A

PURCHASE ORDER SUBMITTAL

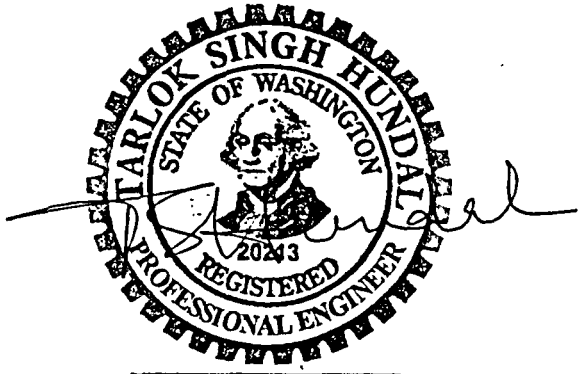
IQRPE REVIEW
OF
THE LOW ACTIVITY WASTE FACILITY OFFGAS PROCESS (LOP) SYSTEM MELTER 1 AND MELTER 2 SBS CONDENSATE VESSELS (LOP-VSL-00001/2)

"I, Tarlok S. Hundal, have reviewed and certified a portion of the design of a new tank system or component located at the Hanford Waste Treatment Plant, owned/operated by Department of Energy, Office of River Protection, Richland, Washington. My duties were independent review of the current design for the Low Activity Waste Facility (LAW) Offgas Process (LOP) System Melter 1 and Melter 2 SBS Condensate Vessels (LOP-VSL-00001/2) as required by The Dangerous Waste Regulations, namely, WAC 173-303-640(3) applicable paragraphs [i.e., (a) through (g)]."

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

The documentation reviewed indicates that the design intent fully satisfies the requirements of the WAC.

The attached review is six (6) pages numbered one (1) through six (6).



EXPIRES: 02/15/06

T S Hundal
Signature

2-4-04
Date

STRUCTURAL INTEGRITY ASSESSMENT OF THE LOW ACTIVITY WASTE FACILITY OFFGAS PROCESS (LOP) SYSTEM MELTER 1 AND MELTER 2 SBS CONDENSATE VESSELS (LOP-VSL-00001/2)

COGEMA-IA-034
Rev. 0

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

Scope	Scope of this Integrity Assessment	This Integrity Assessment includes two LAW LOP Melter 1 & Melter 2 SBS Condensate Vessels: LOP-VSL-00001/2 including their appurtenances, located in cells L-0123/L0124 respectively, at Elevation 3'-0" in the LAW Vitrification Building.
References	Specifications, Drawings and Mechanical Data Sheets	The following Specifications are listed in Material Requisition No. 24590-QL-MRD-MVA0-00002, Rev. 1 (including Supplement Nos. S01 thru S08 to Rev. 1 of the Material Requisition): Engineering Specification for Pressure Vessel Design and Fabrication; Engineering Specification for Pressure Vessel Fatigue Analysis; Specification for Welding of Pressure Vessels, Heat Exchangers and Boilers; General Specification for Supplier Quality Assurance Program Requirements; Specification for Positive Material Identification (PMI); General Specification for Packing, Shipping, Handling, and Storage Requirements; Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks. Drawings: 24590-LAW-MV-LOP-00001, Rev. 0, Equipment Assembly LAW Melter 1 SBS Condensate Vessel (LOP-VSL-00001) (Q); 24590-LAW-MV-LOP-00002, Rev. 0, Equipment Assembly LAW Melter 2 SBS Condensate Vessel (LOP-VSL-00002) (Q); 24590-LAW-P1-P01T-P0002, Rev. 2, LAW Vitrification Building General Arrangement Plan at El. 3'-0"; 24590-LAW-P1-P01T-P0010, Rev. 3, LAW Vitrification Building General Arrangement Section K-K and L-L; 24590-LAW-M5-V17T-P0007, Rev. 0, Process Flow Diagram LAW Melter 1 Primary Offgas Treatment System (System LOP); 24590-LAW-M5-V17T-P0008, Rev. 0, Process Flow Diagram LAW Melter 2 Primary Offgas Treatment System (System LOP); 24590-LAW-M6-LOP-00001, Rev. 0, P & ID-LAW Primary Offgas Process System Melter 1 (Q); 24590-LAW-M6-LOP-00002, Rev. 0, P & ID-LAW Primary Offgas Process System Melter 2 (Q). Mechanical Data Sheets: 24590-LAW-MVD-LOP-00004, Rev.0, LAW Melter 1 SBS Condensate Vessel (LOP-VSL-00001); 24590-LAW-MVD-LOP-00005, Rev.0, LAW Melter 2 SBS Condensate Vessel (LOP-VSL-00002).
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information" were reviewed and found to furnish adequate design controls and requirements to ensure the design intent fully satisfies the requirements of Washington Administrative Code, WAC-173-303-640, *Dangerous Waste Regulations* for Tank Systems.

	Information Assessed	Source of Information	Assessment
Design	Vessel design standards are appropriate and adequate for the vessel's intended use.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheets listed above under References; 24590-LAW-3YD-LOP-00001, Rev. 0, System Description for LOP and LVP: LAW Melter Offgas.	The LAW LOP system Melter 1 and Melter 2 SBS Condensate Vessels, LOP-VSL-00001/2 and their appurtenances are to be designed to the ASME Section VIII, Division 1 rules which are appropriate for pressure vessels operating with mixed waste solutions over the pressure and temperature ranges specified for these vessels. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. Supplementary requirements address pressure vessel, positive material identification, lifting attachment design, equipment drop evaluation, fabrication tolerances, acceptable welding procedures for the vessel and appurtenances, welder qualifications and testing records, NDE inspections and records, and lifting, packaging, shipping, handling and storage requirements. The vessels are subjected to cyclic loading. The Specification for Fatigue Analysis requires the use of ASME Section VIII, Division 2 rules for vessel components with a high number of load cycles. These are adequate and acceptable design standards for the intended use of the vessels. The LOP-VSL-00001/2 are vertical vessels with a 144 in. ID and a height of 98 in. from the bottom tangent line to the top tangent line. The vessels' top and bottom Flanged & Dished (F & D) heads and shells are built with 5/8" thick plate. Each vessel is supported on a cylindrical skirt (1/2" thick plate by approx. 2'-8" high) which in turn is supported on a base plate anchored to the concrete floor at Elev. 3'-0". Each vessel has internal equipment such as an eductor, spay nozzle, and piping that are supported from the vessel's top head. Material for the shell, top and bottom heads, and vessel's internal equipment is Hastelloy C-22 (SB-575 N06022) and is hereafter referred to as C-22. Each vessel's shell and bottom head has an external cooling coil jacket made of SA-312 304 stainless steel (0.030% maximum carbon content) half-pipe section. The supporting skirt is specified as SA-240 304 stainless steel plate (0.030% maximum carbon content) and is hereafter referred to as 304. The operating volume is to be about 7,400 gallons and the total internal volume is to be about 9,050 gallons.

	Information Assessed	Source of Information	Assessment
Design	If a non-standard vessel is to be used, the design calculations demonstrate sound engineering principles of construction.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheets listed above under References.	The LOP Melter 1 and Melter 2 SBS Condensate Vessels, LOP-VSL-00001/2 are standard ASME Section VIII, Div. 1 vessels. The Mechanical Data Sheets require that the ASME Section VIII, Division 1 vessels be delivered after design, fabrication, inspection and testing with an ASME code stamp and that the vessels be nationally registered. Supplemental design information is provided by the reference documents listed in the Source of Information column for utilizing sound engineering principles of construction of the vessels.
	Vessel has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheets listed above under References; 24590-LAW-3YD-LOP-00001, Rev. 0, System Description for LOP and LVP: LAW Melter Offgas.	The Mechanical Data Sheets identify each vessel's operating pressure and temperature ranges, the materials selected for the vessel, the corrosion allowance, the vessel quality level, and its seismic category. The design specification for the vessel requires specific consideration of the operating pressures and temperatures and seismic loads in the design process. ASME Section VIII, Div. 1 requires that the corrosion allowance thickness shall be excluded from the nominal vessel thickness when evaluating the adequacy of the vessel components to sustain the applicable loads at end of life. The Engineering Specification for Seismic Qualification Criteria for Pressure Vessels adopts ASME Section VIII, Div. 2 design rules to address seismic design and analysis of the vessel and ASME Section VIII, Div.1 for the design of the vessel supports. Detailed requirements for seismic load determination are furnished in the Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks. These codes and standards are adequate and appropriate for the design of the LOP vessels to withstand operating pressure and temperature loads and seismic loads for the specified design life.

	Information Assessed	Source of Information	Assessment
Foundation	Vessel foundation will maintain the load of a full vessel.	Specifications listed under Material Requisition above under References; 24590-WTP-DB-ENG-01-001, Rev. 1A, Basis of Design.	The Engineering Specification for Pressure Vessel Design and Fabrication requires the use of ASME BPV Code, Section VIII, Division 1 for the design of the vessel supports. This code ensures an adequate design for the vessel supports. Chapter 14 of the Basis of Design document requires that the vessel foundation design must be adequate to support the loads from full vessels.
	If in an area subject to flooding, the vessel is anchored.	Specifications listed under Material Requisition under References.	Buoyant forces of an empty vessel in a flooded room are a mandatory standard design load case in the Specification for Pressure Vessel Design and Fabrication.
	Vessel system will withstand the effects of frost heave.	24590-WTP-DB-ENG-01-001, Rev. 1A, Basis of Design.	The Basis of Design document requires that all structural foundations for outdoor equipment to extend a distance below grade that exceeds the 30" depth of the frost line. The vessels are located inside/interior of the building at Elev. 3'-0" level, and the building's lower level floor is at Elev. (-) 21'-0", therefore, the vessels' foundations are not subject to frost heave.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, storage temperature)	Mechanical Data Sheets listed above under References; Plant Item Material Selection Data Sheet, 24590-LAW-N1D-LOP-P0002, Rev. 0, LOP-VSL-00001 & LOP-VSL-00002 (LAW) Melter 1 & Melter 2 SBS Condensate Vessel; 24590-WTP-PSAR-ESH-01-002-03, Rev. 1, Preliminary Safety Analysis Report to Support Construction Authorization: LAW Facility Specific Information; Ecology Permit # WA7890008967, *Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste,* Chapter 10, and Attachment 51, "Waste Treatment and Immobilization Plant."	The Mechanical Data Sheets present the waste specific gravity, storage temperatures and pressures. The Plant Item Material Selection Data Sheet addresses the pH range and chemical composition of the waste to select appropriate vessel materials and specify the corrosion allowance. Other waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are addressed by the Preliminary Safety Analysis Report for the LAW Vitrification Building and in Part A of the Permit, as an integral part of the design process. The LOP vessels provide primary confinement of the waste during normal operations, abnormal operations and during and after a Design Basis Earthquake. Each vessel continually pumps condensate to SBS column vessel (LOP-SCB-00001/2) to maintain their operation level. The recirculation process helps prevent the build-up of any flammable gases. The vessels are grounded to control ignition sources.
	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Plant Item Material Selection Data Sheet, 24590-LAW-N1D-LOP-P0002, Rev. 0, LOP-VSL-00001 & LOP-VSL-00002 (LAW) Melter 1 & Melter 2 SBS Condensate Vessel; 24590-LAW-3YD-LOP-00001, Rev. 0, System Description for LOP and LVP: LAW Melter Offgas.	The Plant Item Material Selection Data Sheet demonstrates that the vessels are designed to process the wastes discussed above. The System Description discusses normal and abnormal operations for the LOP vessels. The solids accumulated in the vessels are suspended by the Eductors (LOP-EDUC-00001/2) powered by a side stream from the recirculation line. The cooled condensate is recycled via purge pumps (LOP-PMP-00001/4) to the SBS column vessels.
	The waste types are compatible with each other.	24590-LAW-3YD-LOP-00001, Rev. 0, System Description for LOP and LVP: LAW Melter Offgas.	The System Description for the LAW (LOP) does not describe any operations where incompatible wastes are mixed in these vessels for processing. The LOP system vessels function primarily to process byproduct offgas from the LAW Melters concentrated feed waste received from the Pretreatment Facility (PTF).

	Information Assessed	Source of Information	Assessment
Corrosion Protection	Vessel material and protective coatings ensure the vessel structure is adequately protected from the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system)	Drawings and Mechanical Data Sheets listed above under References; Plant Item Material Selection Data Sheet, 24590-LAW-N1D-LOP-P0002, Rev. 0, LOP-VSL-00001 & LOP-VSL-00002 (LAW) Melter 1 & Melter 2 SBS Condensate Vessel; 24590-LAW-3YD-LOP-00001, Rev. 0, System Description for LOP and LVP: LAW Melter Offgas.	The Plant Item Material Selection Data Sheet shows that the LAW Submerged Bed Scrubber vessels, LOP-VSL-00001/2 normally operate at a pH range of 2 to 7, and at a temperature range of 104°F to 158°F. The vessels are designed for 15 psig pressure and a temperature of 237°F. Other pertinent vessel operation and design information is provided in the Mechanical Data Sheets. The material selected is C-22 and a corrosion allowance of 0.08 in. The LOP vessels are located in the LAW facility cells (L-0123/L-0124) at Elevation 3'-0". Each vessel's support skirt material is 304. Each cell is equipped with a sump pump to remove any leakage. Therefore, the cells should remain dry during normal operations which will limit external corrosion of the vessel over the facility design life.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the vessel.	Mechanical Data Sheets listed above under References; Plant Item Material Selection Data Sheet, 24590-LAW-N1D-LOP-P0002, Rev. 0, LOP-VSL-00001 & LOP-VSL-00002 (LAW) Melter 1 & Melter 2 SBS Condensate Vessel.	The bases for the LOP vessel's material selection and corrosion allowance are furnished in the Plant Item Material Selection Data Sheet. Selection of C-22 material for the vessels with a corrosion allowance of 0.08 in. for a service life of 40 years is adequate and appropriate. The material selections and corrosion allowances are carried forward to the Mechanical Data Sheets, consistently and correctly.
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessel are exceeded.	Drawings listed above under References; 24590-LAW-3YD-LOP-00001, Rev. 0, System Description for LOP and LVP: LAW Melter Offgas.	The LOP Melter 1 and Melter 2 SBS Condensate Vessels, LOP-VSL-00001/2 are designed for continuous condensate pump out to SBS Column Vessels (LOP-SCB-00001/2) which are also located at Elevation 3'-0", as shown on the drawings and described in the System Description document. The vessels are vented via the 2"diameter outlet lines to the SBS Column Vessels (LOP-SCB-00001/2) into the main offgas discharge pipe. These vents prevent the over pressurization of the SBS Condensate Vessels.